



# Spectral Gamma-Ray Borehole Log Data Report

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Borehole

# 30-09-07

Log Event A

## Borehole Information

Farm : <u>C</u>	Tank : <u>C-109</u>	Site Number : <u>299-E27-135</u>
N-Coord : <u>42,963</u>	W-Coord : <u>48,342</u>	TOC Elevation : <u>649.00</u>
Water Level, ft : <u>122.10</u>	Date Drilled : <u>3/31/1982</u>	

## Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>1</u>	Bottom Depth, ft. : <u>125</u>	

## Borehole Notes:

This borehole was drilled in March 1982 and completed to a depth of 125 ft with 6-in. casing. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. A drilling log was not available for this borehole; however, information presented in Chamness and Merz (1993) indicates that the borehole was grouted but not perforated. The depth of the grouted interval was not specified. The top of the casing, which is the zero reference for the SGLS, is approximately 2.5 ft above the ground surface. Because elevation data was not available for this borehole, the elevation of top of the casing was estimated to be approximately 649 ft.

## Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

## Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>03/20/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>14.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>2</u>	Log Run Date : <u>03/21/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>124.5</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>42.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>
Log Run Number : <u>3</u>	Log Run Date : <u>03/24/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>43.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>13.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



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## Analysis Information

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Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 09/05/1997

### Analysis Notes :

This borehole was logged by the SGLS in three log runs. The pre-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency, but the post-survey field verification spectra for logging run two failed to meet the acceptance criteria. The energy and peak-shape calibration from the pre-survey field verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging runs.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The man-made radionuclides Cs-137 and Co-60 were detected in this borehole. The Cs-137 contamination was detected continuously from the ground surface to 9.5 ft and nearly continuously from 16.5 to 35.5 ft. An isolated zone of Cs-137 contamination was detected from 11.5 to 12.5 ft. The Co-60 contamination was detected continuously from 79 to 83.5 ft and intermittently between 85 and 92.5 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 and Co-60 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

The K-40 concentration values steadily decrease from 26.5 to 40 ft, increase significantly from 40 to 41.5 ft, and remain elevated to a depth of 73.5 ft. The K-40 concentrations increase again at about 74 ft, remain elevated to a depth of about 118 ft, then gradually decrease to the bottom of the logged interval.

Most of the U-238 concentration data are absent from the ground surface to 3.5 ft. The U-238 concentrations decrease from 120 ft to the bottom of the logged interval.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks C-108 and C-109.

### Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.



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Plots of the spectrum shape factors are included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.